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7 Principal, California Water Research

8  
9 **BEFORE THE**  
10 **CALIFORNIA STATE WATER RESOURCES CONTROL BOARD**  
11

12 HEARING REGARDING PETITION FILED  
13 BY THE DEPARTMENT OF WATER  
14 RESOURCES AND U.S. BUREAU OF  
15 RECLAMATION REQUESTING CHANGES  
16 IN WATER RIGHTS FOR THE  
17 CALIFORNIA WATERFIX PROJECT

18 OBJECTION TO ADMISSION OF  
19 MODELING DATA FILES AS  
20 STAND-ALONE EXHIBITS

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22 California Water Research is participating in the WaterFix Water Right Change Petition  
23 Hearing on public interest grounds, and advocating for scientific integrity and transparency in the  
24 WaterFix Hearing use of computer modeling. Deirdre Des Jardins, principal at California Water  
25 Research (“California Water Research”) raised a verbal objection on March 1, 2018 to admission  
26 of the following modeling files:

27 DWR-1074 DSM2 HYDRO modeling files (2471.76 MB)  
28 DWR-1075 CALSIM BA H3+ modeling files (19.13 MB)  
DWR-1076 DSM2 BA H3+ modeling files (2250.09 MB)  
DWR-1077 CALSIM CWF H3+ modeling files (11.74 MB)  
DWR-1078 DSM2 CWF H3+ modeling files (3638.55 MB)  
DWR-1081 US Temperature modeling files BA H3+ (134.43 MB)  
DWR-1082 US Temperature modeling files NAA (135.11 MB)

29 The objection was raised by California Water Research after DWR’s modeling expert,  
30 Erik Reyes, could not recognize a file extracted from the CALSIM CWF H3+ modeling files

1 (Exhibit DWR-1077) which showed the assumptions about Oroville carryover storage in the  
2 model. DWR's attorneys objected to the file being introduced on cross-examination, on the  
3 grounds that the extracted file had not been authenticated. (March 2, 2018, Rough Transcript, p.  
4 70.)<sup>1</sup> The situation reflected major issues with DWR's CALSIM II modeling files as Hearing  
5 exhibits. It was requested that California Water Research file a written objection.

6 California Water Research hereby objects to the admission of the above enumerated  
7 modeling exhibits, based on the exhibits being in a specialized format, requiring specialized  
8 software to extract, and not being accompanied by translations of key information into human-  
9 readable, English language or tabular data formats, accessible by commonly used software such  
10 as Adobe Acrobat Reader (.pdf) or Excel (.xls or .xlsx.), and on points and authorities below.

11 Enclosure D of the October 30, 2015 Hearing Notice also states:

12 6a. Exhibits based on technical studies or models shall be accompanied by sufficient  
13 information to clearly identify and explain the logic, assumptions, development, and  
14 operation of the studies or models. (p. 33)

15 Clearly the March 1, 2018 with cross-examining DWR's modeling witnesses on the CALSIM  
16 model assumptions about Oroville carryover storage shows that the CALSIM model is *not*  
17 accompanied by sufficient English language information to explain logic, assumptions,  
18 development, and operation of the model. Furthermore, as explained below, the input data  
19 representing the model hydrology has been provided in a specialized hydrology database format,  
20 identified only by CALSIM II variable name, with no English language index to the database  
21 fields, or other detailed supporting English language documentation.

22 The model output data series are in the same specialized hydrology database format,  
23 identified only by CALSIM II variable name, with no English language index to the database  
24 fields, as explained below.

25 \_\_\_\_\_  
26 <sup>1</sup> California Water Research requests that correction of the citations to the rough transcript be corrected when the  
27 final transcript is available.

1 Admitting an exhibit which requires specialized expertise to extract and analyze, and then  
2 requiring the opposing parties to pay an expert to extract and analyze it for rebuttal, shifts the  
3 burden of production of evidence. “[T]he the burden of producing evidence as to a particular  
4 fact is initially on the party with the burden of proof as to that fact.” (Evid. Code 550(b.)) For  
5 this reason, California Courts require that documents in foreign languages be accompanied by  
6 translations, certified under oath by a qualified interpreter. (Cal. Rules of Ct. § 3.1110 (g.)) To  
7 do otherwise shifts the burden of production of evidence to the opposing parties to obtain a  
8 certified translation.

9 While there is considerably more latitude in the admission of evidence in administrative  
10 hearings than in civil trials, courts recognize the rights of due process, fairness and a fair hearing  
11 (Code Civ. Proc. § 1094.5.) Although the specialized CALSIM II input and output databases  
12 complies with the letter of the Supreme Court ruling in *English v. City of Long Beach* (1950) 35  
13 Cal.2d 155, 158, that “nothing can be considered as evidence that was not introduced at a hearing  
14 of which the parties had notice or at which they were present,” they do not comply with the  
15 underlying principle, which is that parties have a right to examine and rebut evidence. This has  
16 been settled law for over a century (*Int. Com. Comm. v. Louis. & Nash. R.R.*, (1913) 227 U.S. 88,  
17 93.)

## 18 19 II. READABILITY AND ACCESSIBILITY

20 The CALSIM II model output databases could easily have been accompanied by more  
21 accessible output formats for the main outputs of interest. The Sacramento Valley Water Users  
22 provided such a table for the CALSIM II models used in Part 1 of the hearing in Exhibit SVWU-  
23 201, which included the following 29 key output series (Exhibit SVWU-201, p. 1.)

- 24 1. Trinity Reservoir Storage
- 25 2. Shasta Lake Storage
- 26 3. Oroville Reservoir Storage
- 27 4. Folsom Lake Storage

5. Central Valley Project (CVP) San Luis Reservoir Storage
6. State Water Project (SWP) San Luis Reservoir Storage
7. Keswick Releases
8. Nimbus Releases
9. Feather River Flow at Thermalito
10. Sacramento River Flow upstream of North Delta Diversion
11. Sacramento River Flow downstream of North Delta Diversion
12. Delta Outflow (in thousands of acre-feet)
13. Delta Outflow (in cubic-feet per second)
14. North Delta Diversions
15. South Delta Diversions
16. Total Delta Exports
17. CVP North of Delta Settlement Contractor Deliveries
18. CVP North of Delta Ag Water Service Contractor Deliveries
19. CVP North of Delta Municipal & Industrial (M&I) Water Service Contractor Deliveries
20. CVP North of Delta Refuge Deliveries
21. CVP South of Delta Exchange Contractor Deliveries
22. CVP South of Delta Water Service Contractor Deliveries
23. CVP South of Delta M&I Deliveries
24. CVP South of Delta Refuge Deliveries
25. SWP Table A Deliveries
26. SWP Article 21 Deliveries
27. SWP Article 56 Deliveries
28. SWP Feather River Service Area Deliveries
29. Other North of Delta (NOD) SWP Deliveries.

Other key outputs of major importance in Part 2 of the WaterFix hearing include Delta Cross Channel, QWEST, and OMR flows.

Exhibit SVWU-201 provided the above listed 29 CALSIM II output data series for six Part 1 operational scenarios: (i) No Action Alternative (NAA), (ii) Draft Biological Assessment Preferred Alternative 4A (Alt4A), (iii) Boundary 1 (B1), (iv) H3, (v) H4, and (vi) Boundary 2 (B2) (*Id* at p. 1.) There is no reason that the Department of Water Resources (“DWR”) could not have provided similar tables or Excel spreadsheets with key output data series from DWR’s Part 2 CALSIM II modeling exhibits, so that key data series would have been accessible to all protestants for use in cross-examination and rebuttal.

1 The CALSIM II and DSM2 model outputs provide the information required under Water  
2 Code section 1701.2 and the Board’s regulations. Cal. Code Regs., tit. 23, section 794,  
3 subdivision (a)(9) requires “identification in quantitative terms of any projected change in water  
4 quantity, water quality, timing of diversion or use, consumptive use of the water, reduction in  
5 return flows, or reduction in the availability of water within the streams affected by the proposed  
6 change(s).” In Part 1 of the Hearing, DWR’s witnesses repeatedly testified on cross-examination  
7 that DWR’s CALSIM II and DSM2 model outputs provided quantitative information on  
8 projected changes to Delta flows and water quality from the WaterFix project. DWR also  
9 submitted an exhibit which stated that the CALSIM II and DSM2 modeling provided the  
10 information required on impacts to legal users of water. (Exhibit SWRCB-324, p. 8.) To the  
11 extent that the proposed operations in Part 1 have been superseded by the revised proposed  
12 operations in CWF H3+, the CWF H3+ CALSIM and DSM2 is the current quantitative  
13 information on changes to flows, timing of diversions, and water quality, required under the  
14 Water Code and the Board’s regulations.

15 When Petitioners’ witnesses relate as true information from the modeling on project  
16 impacts, it is a violation of the confrontation clause of the state and federal constitutions for  
17 protestants not to be able to examine the key modeling assumptions<sup>2</sup> and model outputs their  
18 testimony is based on. (*People v Sanchez* (2016) 63 C4th 665, 686.) It is also a fundamental  
19 issue of fairness and a fair hearing (Code Civ. Proc. § 1094.5.)  
20  
21

## 22 II. ACCESSING MODELING FILES

23 The CALSIM II model outputs consist of 6,809 data series in an Army Corps of  
24 Engineers Hydrologic Engineering Center’s HEC-DSS format database. Each data series is

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25  
26 <sup>2</sup> California Water Research does not raise this objection with respect to any rebuttal exhibits by protestants, who  
have no control over whether DWR provides adequate documentation of model inputs.

1 identified only with the name of the corresponding CALSIM II variable. Translating a model  
2 output of key interest (such as Trinity, Shasta, or Oroville storage) to the relevant CALSIM II  
3 variable name requires some understanding of the internal structure of the CALSIM II model,  
4 and the ability to read a CALSIM II “node map.” In addition, extracting the data series from the  
5 HEC-DSS database into either tabular or graphical format takes time and expertise in using  
6 specialized software that reads HEC-DSS databases.

7 The CALSIM II model input is also provided only as an HEC-DSS database, indexed by  
8 CALSIM II variable name, with no documentation of the variable names, how they are related to  
9 the model’s representation of the underlying hydrology, or how the values were derived. Thus  
10 the model input databases and assumptions are not adequately documented. This has long been  
11 an issue with the CALSIM II model. The 2003 CALSIM II Strategic Review (Exhibit DDJ-101)  
12 stated:

13 There has not been sufficiently systematic, transparent, and accessible approach to the  
14 development and use of and operational data. The administration of data development is  
15 fragmented, disintegrated, and lacks a coherent technical or administrative framework.  
(*Id* at p. 20.)<sup>3</sup>

16 The 2004 Peer Review Response by the Department of Water Resources and the U.S.  
17 Bureau of Reclamation (“USBR”) (Exhibit DDJ-102) promised that detailed documentation  
18 would be maintained:

19 The validity of data inputs impacts both model results and model credibility. The greatest  
20 concern is the validity of the hydrologic inputs and parameters. Concern is compounded  
21 by the current lack of complete documentation. Over the last two years DWR and  
22 Reclamation have attempted to document model inputs. Reclamation is currently  
23 documenting the current CalSim-II hydrology procedures. This effort needs to be  
24 extended and updated. (*Id* at Section 4.3.2. Data, p. 17.)

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26 <sup>3</sup> California Water Research testified on this in Part 1 (Exhibit DDJ-108 Errata 12-9.)

1 The Petitioners have only provided very general documentation for the Hearing record, and  
2 documentation of inputs may no longer be maintained (March 2, 2018, Rough Transcript, p.  
3 200.)<sup>4</sup>

4 The DSM2 model output files are also in a specialized format, and have only been  
5 provided as 15-minute time series for the CWF H3+ operating scenario. There is no reason that  
6 the information at key locations could not also have been provided in a more accessible format.  
7 When requesting salinity modeling for the 1995 Water Quality Control Plan, Tom Howard, then  
8 Chief of the Board's Bay-Delta Unit, specified outputs in accessible data formats. Howard  
9 specified key locations of interest, and stated:

10  
11 Please provide the flow outputs in tabular forms, and the salinity outputs in both tabular  
12 and graphical forms. Tabular outputs should be in ASCII or other Lotus 1-2-3 compatible  
13 formats. (Exhibit DDJ-89, p. 2.)

### 14 III. ARGUMENT

15 The California Evidence Code defines "writing" very broadly to include all "means of  
16 recording upon any tangible thing any form of communication or representation, including  
17 letters, words, pictures, sounds, or symbols, or combinations thereof." (Evid. Code, § 250.) Thus  
18 the CALSIM II, DSM2 and Temperatures models and input and outputs are clearly writings  
19 under California law. But they are not "writings" that is human readable or accessible to non-  
20 experts.

21 In a civil trial, computer data is considered an "original" and admissible if it is in the  
22 form of "any printout or other output readable by sight." (Evid. Code § 255.) None of the model  
23 outputs are "readable by sight." In a civil trial, the question then would be whether the output  
24 data is an admissible copy without accompanying human-readable tabular or graphical data, or  
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26 <sup>4</sup> Detailed citations will be provided once the March 1, 2018 certified transcript is available.

1 the input data is an admissible copy without appropriate, accessible English language  
2 documentation of what the fields mean. California Water Research argues that the answer would  
3 likely be “no.” CALSIM II model databases are analogous to very large files indexed in a foreign  
4 language, and they would be inadmissible in a civil trial for two reasons. First, there is no  
5 “translation” of the CALSIM II variable names to plain English terms such as “Trinity storage,  
6 Shasta” and second, the database format requires specialized software and specialized knowledge  
7 to extract.

8 Given that the Bay-Delta Modeling office has used Excel spreadsheets to review  
9 modeling data, including CALSIM II (R.T. August 26, 2016, 111:24-112:1) and DSM2 data for  
10 the North Delta (R.T. May 5, 2017, 149:25-150:22), there is no reason that these spreadsheets, or  
11 other suitable tabular format data, could not have been provided for the Hearing record.

12  
13 Dated March 7, 2018

Respectfully submitted,

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17 Deirdre Des Jardins  
18 Principal, California Water Research  
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**STATEMENT OF SERVICE**

**CALIFORNIA WATERFIX PETITION HEARING  
Department of Water Resources and U.S. Bureau of Reclamation  
(Petitioners)**

I hereby certify that I have this day submitted to the State Water Resources Control Board and caused a true and correct copy of the following document(s):

**OBJECTION TO ADMISSION OF MODELING DATA FILES AS  
STAND-ALONE EXHIBITS**

to be served by Electronic Mail (email) upon the parties listed in the Current Service List for the California Water Fix Petition Hearing, dated March 6, 2018, posted by the State Water Resources Control Board at [http://www.waterboards.ca.gov/waterrights/water\\_issues/programs/bay\\_delta/california\\_waterfix/service\\_list.shtml](http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/service_list.shtml)

*Note: In the event that any emails to any parties on the Current Service List are undeliverable, you must attempt to effectuate service using another method of service, if necessary, and submit another statement of service that describes any changes to the date and method of service for those parties.*

I certify that the foregoing is true and correct and that this document was executed on March 7, 2018.

Signature:



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Title: Principal, California Water Research

Party/Affiliation:  
Deirdre Des Jardins

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